LGC340A

BLACK BOX NETWORK SERVICES

IE GIGA MC TX/SFP

This standalone device provides two 10-/100-/1000-BASE-T copper ports and two SFP ports.

Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746 • Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018 • Web site: www.blackbox.com • E-mail: info@blackbox.com

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FCC and Industry Canada RF Interference Statements

Class A Digital Device (using 48V Telco type power). This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le Industrie Canada.

Class B Digital Device (using all other power options). This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Certifications

CE

**Class 1 Laser product, Luokan 1 Laserlaite,
Laser Klasse 1, Appareil A'Laser de Classe**

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.

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Part Numbers

Part Number	Description
LGC340A	IE GIGA MC TX/SFP

1. Specifications

Operating Temperature	-40°F to +185° F (-40°C to +85°C) DC configuration +14°F to +122° F (-10°C to +50°C) AC
Storage Temperature	-67°F to +257°F (-55°C to +125° C)
Humidity	5 to 95% (non-condensing); 0 to 10,000 ft. altitude
Dimensions	0.86”H x 3.66”W x 3.88”D (2.2cm H x 9.3cm W x 9.8cm D)
Current Draw	1.5A @ room temperature with data and copper SFPs 1.1A @ room temperature with fiber SFPs
DC Terminal	48 VDC Telco
DC Jack	5 VDC
Double-USB Power Cable	Spec 500mA Note that the laptop or PC USB ports must be 2.0 or greater to provide sufficient power to the unit.
Ethernet Connections	• SFP 1000BASE-X • SFP 100BASE -FX • SFP 10/100/1000 Copper (SGMII) • 10/100/1000 BASE-T (Fixed Copper ports) • Auto Negotiation • Auto-Cross • Flow Control • Up to 10,240 MTU • Full Line-Rate Forwarding
Standards/Compliance	• IEEE 802.3x Flow Control • IEEE 802.3i 10BASE-T twisted pair • IEEE 802.3u 100BASE-TX twisted pair • IEEE 802.3u 100BASE-FX or SX fiber

2. Overview: About the IE GIGA MC TX/SFP

The IE GIGA MC TX/SFP is an SNMP manageable standalone device providing two fixed 10/100/1000Base-T copper ports and 2 SFP ports. The SFP ports support fiber or copper SFPs. As a plug and play device, the IE GIGA MC TX/SFP provides several distinct modes of operation to support a wide range of applications. The IE GIGA MC TX/SFP provides OAM functionality with 802.3ah (LINK-OAM ah) and 802.1ag (SERVICE-OAM ag) supported on each port. It supports jumbo frame sizes of up to 10,240 bytes as well as AutoCross on the copper ports. Power options for the IE GIGA MC TX/SFP include both a standard low voltage wall transformer and a Power Block for Office Battery or a DC Power Supply connection. As an Industrial Ethernet device, it supports an extended temperature range of -40°C to +85°C. A console port and a DIP Switch bay provide configuration options.

The IE GIGA MC TX/SFP can be directly managed, because it contains on-board logic. Management capability is available if the device has firmware version 123-00A1 or higher, which can be downloaded from the Black Box site. iView^2 is a free software, posted on the website under Support/Downloads. Please refer to page 12 for details.

The IE GIGA MC TX/SFP requires two small form-factor (SFP) modules which provide greater flexibility in the network environment. The hot-swappable nature of the SFPs, available in dual strand for Multi Mode and Single Mode, and single strand fiber types for Single Mode, allow for easy configuration and future upgrading as network demands evolve. The SFP modules must be MSA-compliant and both DDMI and non-DDMI are supported. The fiber SFP can support 100Mbps or 1000Mbps; while the copper SFPs support 10/100/1000Mbps and 1000Mbps.

SFPs are sold separately and meet Class 1 Laser Safety Standard.

3. Configuration

The IE GIGA MC TX/SFP offers a full feature set including Auto Negotiation, Selective Advertising, AutoCross, VLANs, SNMP management, loopback testing and OAM. Unit software updates can be downloaded through TFTP or iView^2 (iConfig view).

IE GIGA MC TX/SFP features include:

- SNMP manageable
- OAM AH
  - IEEE 802.3ah Link OAM for per port monitoring (OAM AH)
- OAM AH Functions
  - Discovery
  - Link Performance Monitoring
  - Remote Loopback
  - Fault Detection
  - Link Fault
  - Dying Gasp
  - Critical Event
- OAM CFM (SERVICE-OAM)
  - IEEE 802.1ag Connectivity Fault Management (OAM CFM)
  - OAM CFM Functions
  - Continuity Check
  - Loopback
- Speed/duplex modes
- 802.1q VLAN
- Extra tagging with user-defined VLAN tag Ethertype
- Ethertype 88A8 as defined in 802.1ad
- Command Line Interface capable (CLI)
- Telnet
- Password assignment via CLI, Telnet or iView^2
- DIP Switch configuration for Modes
- Bandwidth Limiting

3.1 Operations, Administration and Maintenance (OAM)

OAM is a general term used in network management and is typically applied to a series of standard protocols for installing, monitoring, and troubleshooting Metropolitan Area Networks.

When applied to Ethernet – OAM is typically assumed to refer to the layer 2 (MAC layer), management protocols, specifically 802.3ah and 802.1ag. Layer 2 management protocols do not need higher level transport protocols to operate, OAM data is transferred in standard multicast Ethernet frames.

802.3ah OAM: (LINK-OAM)	Is a point-to-point protocol designed to verify a specific link between two directly connected devices (over copper or fiber), which support 802.3ah OAM. One device must be configured to be an active OAM device, the other a passive (typically the core switch would be the active device, the end device passive). 802.3ah OAM provides link status, remote fault detection and the ability to initiate a loopback circuit.
802.1ag: (SERVICE-OAM)	Often referred to as Connectivity Fault Management (CFM), is an end-to-end protocol designed to verify a specific network path between two devices that may well be in different geographical locations. CFM allows the network operator to administer, monitor and debug the network using continuity check (a heart beat message), link trace (similar to traceroot, but operating at the MAC layer) and finally loopback (can be likened to a layer 2 ping).

3.2 iView² Management Software

iView² is the Black Box management software that features a Graphical User Interface (GUI) and gives network managers the ability to monitor and control the manageable Black Box products.

iView² is available in several versions, including a WebServer version 3.0, and can also function as a snap-in module for HP OpenView Network Node Manager and other third party SNMP Management software.

iView^2 supports the following platforms:

- Windows 2000
- Windows XP
- Windows Vista
- Windows 7

Please see the SNMP Management Module manual for software configuration options.

3.3 iView^2 (iConfig view)

iView^2 (iConfig view) is an in-band utility created by Black Box, used for SNMP configuration for Black Box's SNMP-manageable devices.

The iView^2 (iConfig view) feature allows the following to be performed:

- Set an IP address, subnet mask and default gateway
- Define community strings and SNMP Traps

iView^2 (iConfig view) also includes an authorized IP address system and restricted access to MIB groups which are supported by Black Box's manageable devices. These extra layers of security do not affect SNMP compatibility. iView^2 (iConfig view) can upload new versions of the system software and new MIB information. It also includes diagnostic capabilities for faster resolution of technical support issues.

3.4 Configuration via DIP Switch Settings

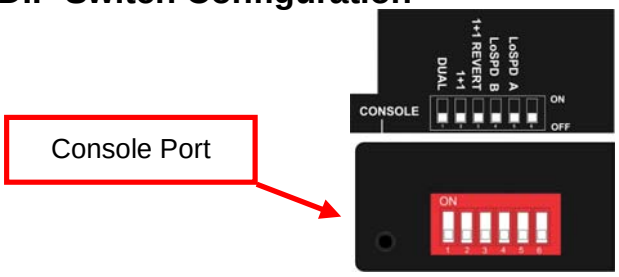
The IE GIGA MC TX/SFP can be configured in one of the following ways via DIP Switch settings:

Configuration Method	Description
4-Port Switch (default)	In this mode, the unit acts as a standard 4-port MAC-layer switch. In this configuration, IEEE802.3ah Passive is enabled on both fiber ports, and can be enabled on the RJ-45 ports through the CLI.
Dual Converter mode	In this configuration, the unit functions as two independent (SFP to TX) media converters and traffic never passes between the two converters.
1+1 SFP Protection Non-Revertive mode	In this mode, the "SFP A" port (fiber or copper) is connected through the switch to the drop ports as the main link. The "SFP B" port (fiber or copper) is active into the MAC switch, but no connection inside the switch is made; in this way, the "SFP B" line is held as the standby line. The "SFP B" line is held in the LINK state for testing and line verification, but does not actively carry user data. When a fault is detected on the active line, all customer traffic is switched to the "SFP B" port. With non-Revertive mode data is not resumed by "SFP A" port.
1+1 SFP Protection Revertive mode	In this mode, the "SFP A" port (fiber or copper) is connected through the switch to the drop ports as the main link. The "SFP B" port (fiber or copper) is active into the MAC switch, but no connection inside the switch is made; in this way, the

Configuration Method	Description
	"SFP B" line is held as the standby line. The “SFP B” line is held in the LINK state for testing and line verification, but does not actively carry user data. When a fault is detected on the active line, all customer traffic is switched to the “SFP B” port. Once the “A” port is no longer in a fault condition, data is resumed on that port.

NOTE
Revertive and Non-Revertive modes can only operate on the ports with SFPs, not the fixed copper ports.

3.4.1 DIP Switch Configuration



DIP Switch	Name	Description	Default Setting
1	Dual	Enable dual channel	OFF
2	1+1	Provides 1+1 protection with non-revertive switching	OFF
3	1+1 Revert	Provides 1+1 protection with revertive switching	OFF
4	LoSpd A	Optional-for future use	OFF
5	LoSpd B	Optional-for future use	OFF
6	Reserved		

3.5 Configuration via serial/Telnet (CLI) or iView²

The IE GIGA MC TX/SFP includes many features that are configurable via a serial/Telnet session (CLI) or through iView² (SNMP Management view or iConfig view).

3.5.1 Configuration Options

The following options are configurable through both the iView² (iConfig view) and Serial/Telnet.

Feature	iView²	Serial/Telnet
Loopback	✓	✓
Auto Negotiation	✓	✓

Feature	iView²	Serial/Telnet
Force Mode	✓	✓
FlowControl	✓	✓
VLANs	✓	✓
IP Address	✓	✓
Subnet Mask	✓	✓
Default Gateway	✓	✓
MIB Community	✓	✓
Traps Assignment	✓	✓
Users	✓	✓
Passwords	✓	✓
Access Level	✓	✓
Reboot	✓	✓
Frame size selection	✓	✓
Bandwidth Limiting	✓	✓

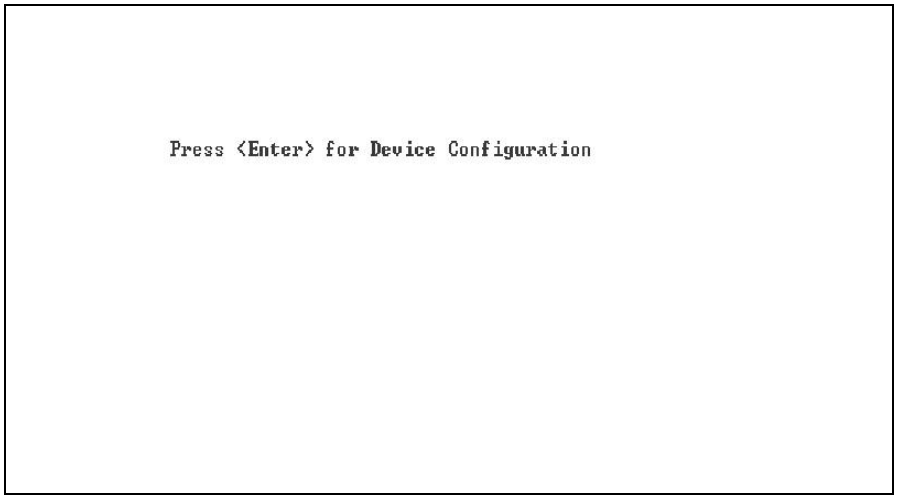
The following table presents management options configurable via iView^2 (iConfig view) or a serial/Telnet session.

Feature	iView^2	Serial/Telnet
PROM Software Download/Upload	✓	
Telnet Session	✓	✓
Software Download Setup (TFTP)		✓
DHCP		✓
Restore Configuration	✓	✓
Save Configuration	✓	

3.5.2 Basic Device Configuration Using the CLI

After running through an initial self test, the screen will display the following message:

Press **Enter** for Device Configuration.



Press **Enter** to open the main configuration screen. This screen allows the user to set the IP address and the destination IP address for traps with the community string, read/write access and password as usual.

```
Saved Values. (These values will be active after reboot)

    IP Address      - 10.10.10.10
    Subnet Mask     - 255.255.255.0                DHCP is Not Active
    Default Gateway - 0.0.0.0


Current Values. (These values are in use now)
    IP Address      - 10.10.10.10
    Subnet Mask     - 255.255.255.0
    Default Gateway - 0.0.0.0


Community String: public    Access:  r/w

Press I to enter new saved parameter values. Press P to change Password.
Press T to enter new Trap Destination. Press K to remove All Trap
Destinations.
Press C to enter new Community String. Press U to remove All Community
Strings.
Press E to End session. Type REBOOT to reboot unit. Press D for DHCP
On/Off.
Press SpaceBar for additional commands.
```

This screen contains the following information and options:

3.5.2.1 Saved and Current Values

Saved values display the changes made during the current session and current values display the values currently in use:

- IP Address (IP address of SNMP agent)
- Subnet Mask (mask to define IP subnet to which agent is connected)
- Default Gateway (default router for IP traffic outside of the subnet)

3.5.2.2 Command List

I = Enter new Saved Parameter Values

P = Change the Password*

T = Enter new Trap Destinations

K = Remove All Trap Destinations

C = Create SNMP Community Strings

U = Delete All SNMP Community Strings

E = End the session*

Reboot = Reboot the unit (may result in short data loss)

D = Enable or disable DHCP

Space Bar = Opens the device specific configuration options screen.

*The screens illustrated in this manual show capabilities for users with Admin rights. Individuals with User-level rights can only view port status and port settings, change their password, end a session, and reboot the unit.

NOTE
It is necessary to reboot the IE GIGA MC TX/SFP after making any modifications to the Saved Values for the changes to take effect. To reboot, type Reboot at the prompt on the Main Configuration screen.

3.5.2.3 Assigning IP Information

To modify the Saved Parameter Values (i.e., assign IP address and subnet mask), press **I**. The system prompts for the IP address and subnet mask for the connected device. Press **Enter** after each entry. A default gateway can also be assigned, or press **Enter** to skip. When finished, press **Enter**, then type **reboot** for changes to take effect. The Current Values can only be saved and acted on after the IE GIGA MC TX/SFP has been successfully rebooted.

3.5.2.4 Password Protection for Serial Port Connections

Password/username is not offered for the serial port by default. This allows the end user to quickly access the device for some basic configuration capability. Password protection is provided for the serial configuration process by pressing **P** on the main configuration screen. Enter a password, keeping in mind that passwords are case-sensitive and must not exceed eight characters or include spaces, and press **Enter**. This password will be requested whenever logging on. To remove password protection, select **P** and, instead of entering a password, press **Enter**.

Passwords have the following requirements:

- The password must be between 1 and 8 characters long
- The password consists of a combination of any ASCII characters except spaces
- Passwords are case sensitive

Passwords are a way to make the management of the Black Box devices secure, but these password lists must be stored and maintained.

3.5.2.5 Assigning SNMP Trap Destinations

Traps are sent by the manageable device to a management PC when a certain event takes place. To enter a trap destination, press **T**. When prompted, enter a New IP Address prompt, enter the appropriate IP address of the destination device and press **Enter**. Then, type the name of the community string (that the destination device has been configured to accept) and press **Enter**. Select whether the trap is for SNMP version 1 or 2c and press **Enter**. This function

enables ALL of the device traps. Supported traps include: Link Down, Link Up, and Last Gasp.

3.5.2.6 Removing Trap Destinations

To remove all trap destinations, press **K**. Press **Y** to continue to confirm or **N** to abort and remove all trap destinations. Press **Enter** to finish.

This function will delete all trap destinations. To selectively delete trap destinations or to disable/enable Traps, use iView^2 (iConfig view) to configure the device.

3.5.2.7 Creating Community Strings

Community strings add a level of security to a network. The default community string is named "public" and has read/write access. For security, "public" should be replaced with custom community strings such as ones created with read-only access (for general use), and another with read/write access (for the administrator).

To create a new community string, go to the main configuration screen and press **C**. Enter the name of the new community (up to 16 characters, no spaces) and press **Enter**. Then type one of the following to assign the community string's access rights:

- **R** = read-only access
- **W** = read/write access
- **Enter** = abort

After entering **R** or **W**, press **Enter**. To finish, press **Enter** and reboot.

3.5.2.8 Deleting Community Strings

To delete all community strings, perform the following:

Press **U**. The "Are you sure you want to delete all future strings?" prompt is displayed. Press **Y** when prompted to proceed and delete all community strings, **N** to abort. Press **Enter** to finish.

This function will delete ALL community strings. To selectively delete community strings, use iView^2 (iConfig view) to configure the device.

3.5.2.9 Ending the Session

Press **E** to end a serial port or Telnet/HyperTerminal session before disconnecting the serial cable. This will stop the continuous stream of data to the serial port.

3.5.2.10 Rebooting the Unit

To reboot the IE GIGA MC TX/SFP, type **reboot** from the main screen or the command menu.

3.5.2.11 Enabling/Disabling DHCP

To toggle DHCP on the IE GIGA MC TX/SFP between enable and disable, press **D** and then **Y.** Press the **Space Bar** once to return to the main screen without making any changes.

DHCP Disable (Static IP Addressing)

DHCP is disabled in the default configuration. Initially, modules are assigned a Static default IP Address of 10.10.10.10. Changes to the Static IP Address can be added manually through iView^2 (iConfig view) or a Console session. The changes will be initiated following reboot of the module.

DHCP Enable (Dynamic IP Addressing)

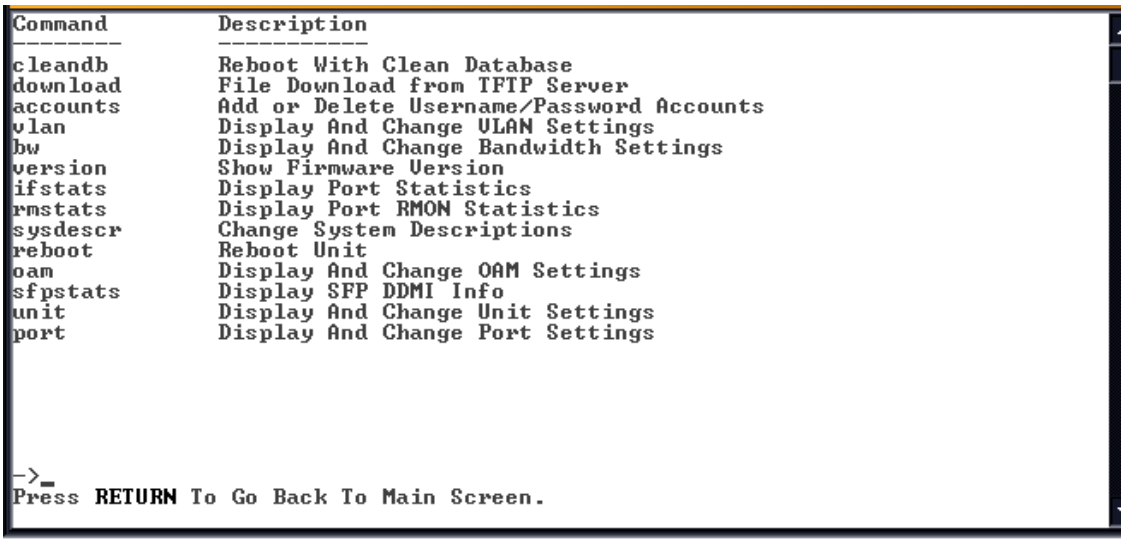
If a DHCP server is present on the network and DHCP is enabled, the DHCP client will initiate a dialogue with the server during the boot up sequence. The server will then issue an IP address to the management card. Once the new IP address is received, the SNMP Management Module will reboot so that the new IP address will take effect. Refer to About Serial Port Configuration for more information about Enabling/Disabling DHCP.

When there is no DHCP server on the network, use the serial configuration to manually set the IP addresses.

When DHCP is enabled, the IP address (default 10.10.10.10 or a previously used IP address, or user-configured) is saved. When DHCP is disabled, the saved IP address will be reinstated and the device will reboot.

DHCP servers give out lease times: devices renew their leases based on the administrator-specified time. If a device cannot renew its lease, and the lease expires, the device will be given the IP address 10.10.10.10 and will reboot.

3.5.3 Commands List (Space Bar)



The IE GIGA MC TX/SFP also includes several device-specific options. To access these options, press the **Space Bar** from the Main Configuration screen, type the name of the action to be performed (as shown below) and press **Enter**.

Command	Description
cleandb	Reboots the unit with a clean database. This removes all information from the database and sets the unit to factory defaults.
download	Downloads firmware via the TFTP protocol
accounts	Allows the addition for User, Superuser, Admin
vlan	Provides selection of two modes of operation to support all VLAN configurations.
bw	Displays settings for Bandwidth configuration
version	Displays the unit's firmware and hardware version
ifstats	Displays interface statistics
rmstats	Displays remote monitoring (RMON) statistics on packets received as defined in RFC 2819 for RMON.
sysDescr	Allows the editing of sysName, sysDescr, and Port information
reboot	Allows a soft reboot of the unit after changes are made by the end user
oam	Enable/disable OAM
sfpstats	Provides information about the wavelength, serial number, output power, BER and other information. Requires an SFP with DDMI.
unit	Unit global settings, frame size selection. Unit OAM enable must be enabled for AH and AG to function.
port	Displays the port status and allows changes to port settings, such as duplex status and speed.

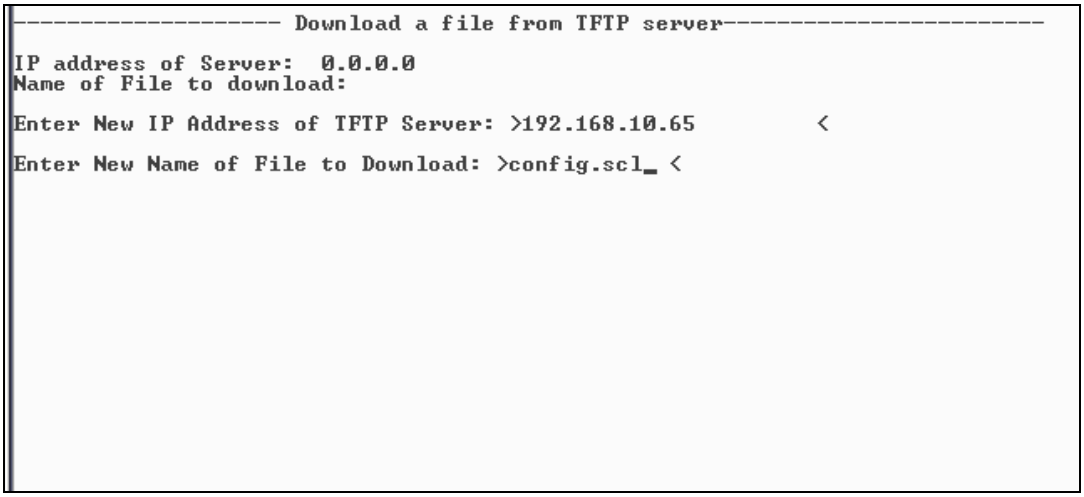
3.5.3.1 Cleandb

Entering cleandb reboots the unit with its database cleaned depending on the option selected. Users are presented with two, sequential options, first to reset

all SNMP settings and, second, to reset all of the unit's configuration to default. Enabling the first option presents the second. Resetting the unit to factory default values (option two) will delete all custom IP and other configurations performed through iView².

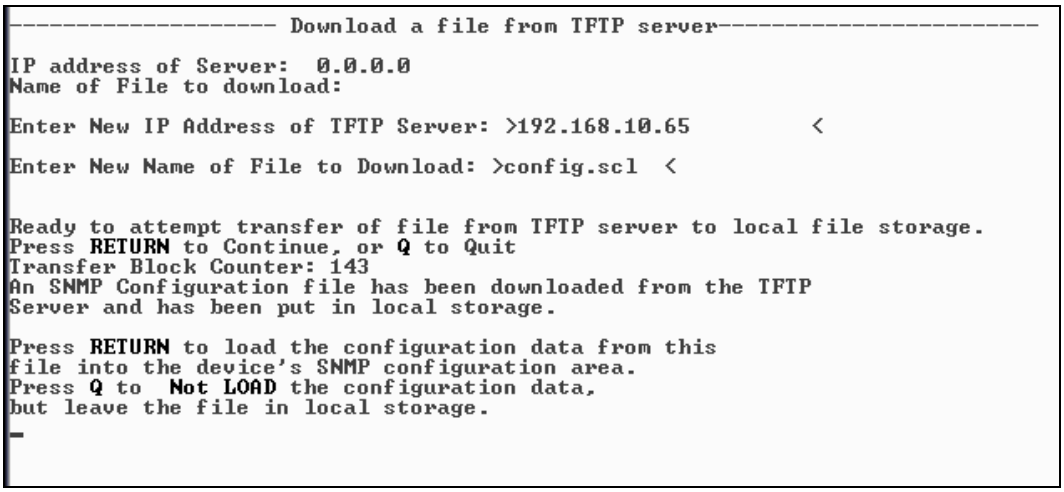
3.5.3.2 Downloading Files

Firmware and/or saved configuration data for the IE GIGA MC TX/SFP can be downloaded via a TFTP connection from a central server via TFTP protocol. Initiate this download via serial configuration or Telnet session. To download a configuration file, type **download** and press **Enter** to be taken to the Download a file screen. This screen displays the IP Address of the TFTP server and the name of the file to be downloaded:



The TFTP server should be open. Press **Enter** to start downloading the file.

After the transfer process is complete, press **Enter** to load the configuration file:



Once loaded into the device's SNMP memory area, the system prompts the user to **reboot** the device to make the new configuration active.

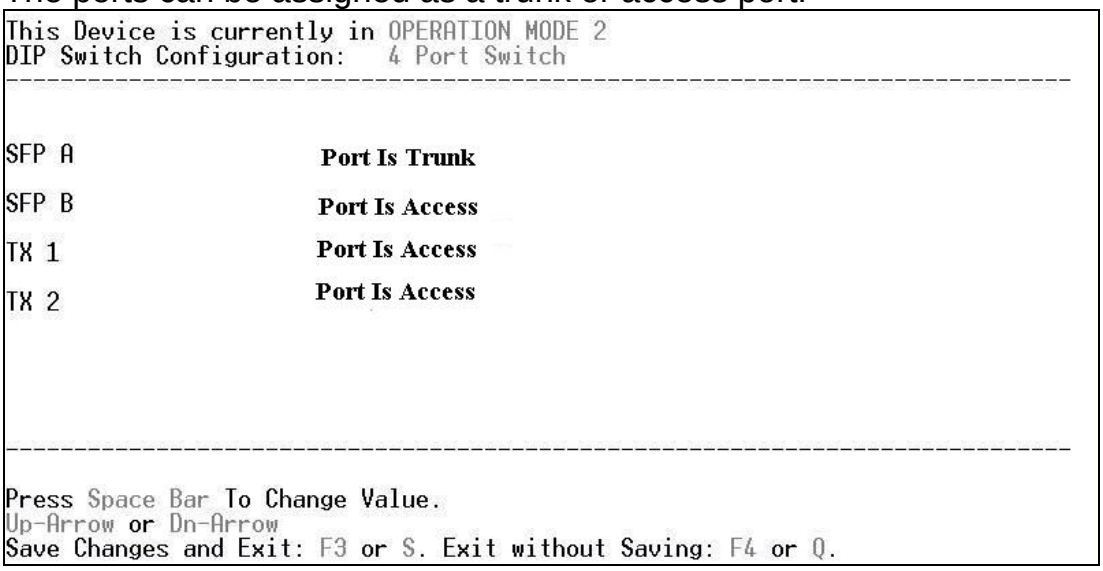
3.5.3.3 Accounts

The following are the three levels for CLI or Telnet account access:

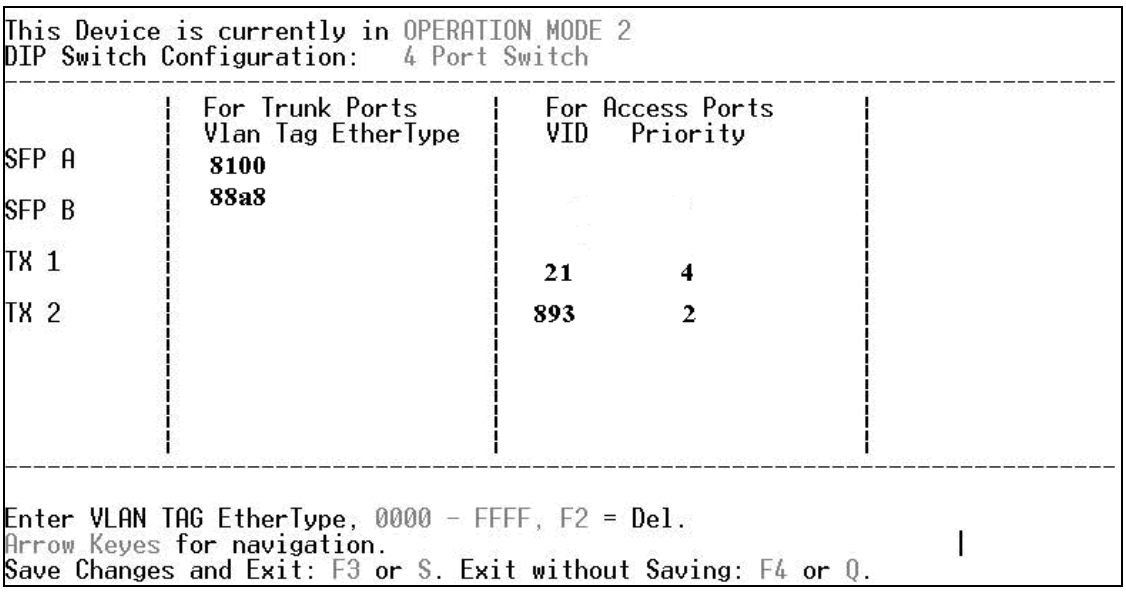
User:	View status, change own password, and reboot.
Operator:	All User privileges mentioned above, plus ability to change settings.
Administrator:	Operator privileges mentioned above, plus ability to add/delete accounts and reinitialize the unit to default settings (cleandb).

3.5.3.4 VLAN Configuration

The ports can be assigned as a trunk or access port.



When configuring a trunk port, an Ethertype can be user-defined (a trunk port is also defined as a provider port based on 802.1ad). If an Ethertype value comes in a trunk port and is different than the user-defined Ethertype, it will be treated as an unrecognized VLAN tagged frame. If configuring the port as an access port, enter a VLAN ID between 1 and 4,094. Possible priority settings are 0 (lowest priority) through 7 (highest priority).



NOTE
When an Ethertype or VLAN ID is assigned, the same values need to be configured at the end device (router, etc) to avoid network configuration problems.

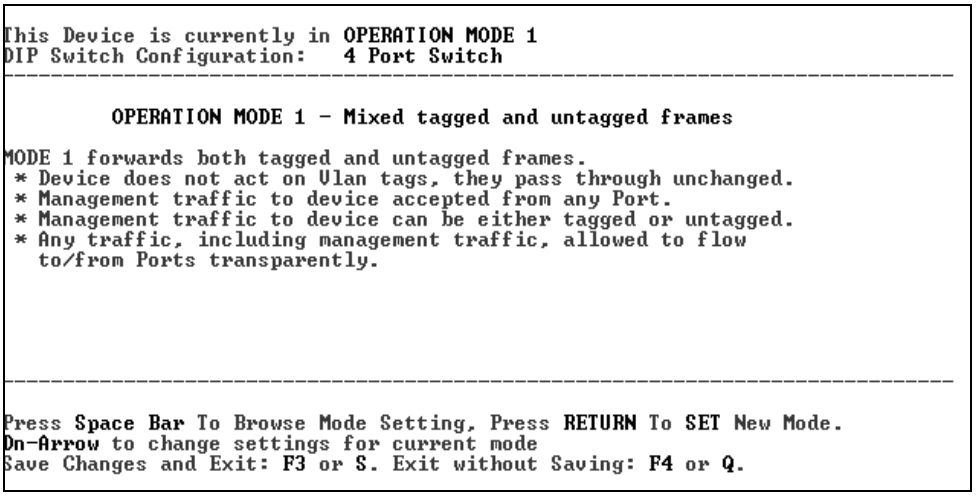
Operational Mode Configuration

There are two modes of operation that can be configured through the Serial/Telnet session: Mode 1, which supports a mixture of tagged and untagged traffic, and Mode 2 Extra tagging.

The configuration screen is accessed by typing **vlan** and pressing **Enter** from the Additional Commands screen. The system displays the current operation mode screen. Press the **Space Bar** to select the other mode.

Operation Mode 1 – Mixed Tagged and Untagged Frames

In this mode, all tagged and untagged frames pass on any given port. Management to the device can be tagged or untagged.



Press the down arrow on the computer keyboard to access additional configuration selections.

```
This Device is currently in OPERATION MODE 1
DIP Switch Configuration:   Dual 2 Port Switches
--------------------------------------------------------------------------------



Management Domain Tags:           Tags on Management Traffic
Management Vlan ID:               3159
Management Vlan Priority          0

Xtratags On IEEE Reserved Frames No Tags on IEEE Res. Frames (Trunks)









--------------------------------------------------------------------------------

Press Space Bar To Change Value. Up-Arrow to go back to previous screen.
Dn-Arrow for next setting.
Save Changes and Exit: F3 or S. Exit without Saving: F4 or Q.
```

WARNING
If a VLAN # is added to a port and is the same VLAN # assigned for a tag on management traffic, saving these changes will disrupt management indefinitely.

Operation Mode 2 Port Based Xtra Tagging

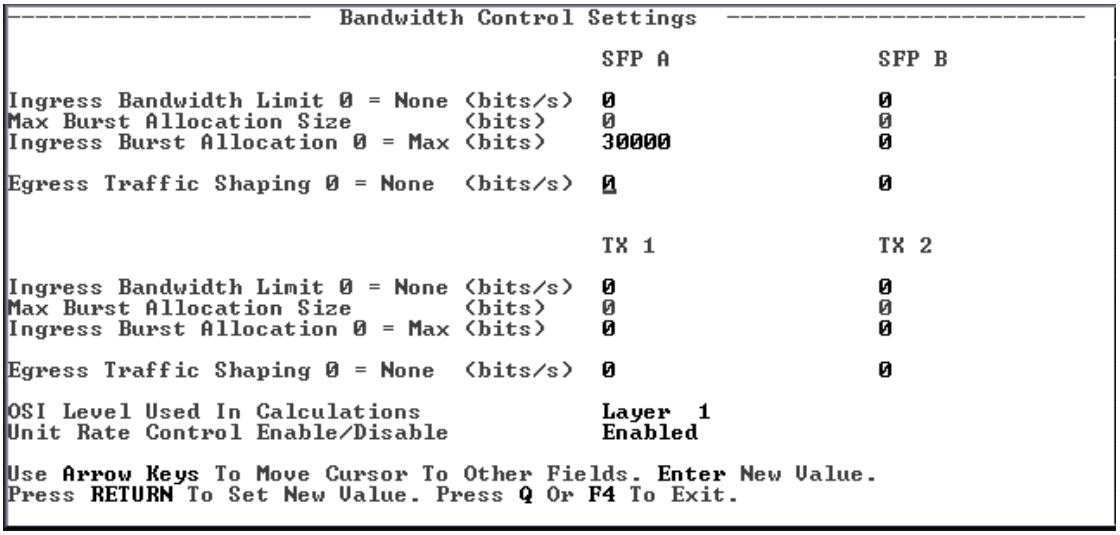
Any port can be configured for extra tags on the frames.

```
This Device is currently in OPERATION MODE 1
DIP Switch Configuration:   4 Port Switch
--------------------------------------------------------------------------------

         OPERATION MODE 2 - Port based Xtra tagging.

In MODE 2 any port can be defined for Xtra tagging
 * A port defined for Xtra tagging is called a Trunk, others are Access ports.
 * Tagged traffic flows freely between Trunks. No adding or deleting of tags.
 * Untagged or improperly tagged frames do not flow between Trunks.
 * One tag will be removed in traffic from Trunk ports to Access Ports.
 * Frames arriving on an Access port will be given an extra tag with
   VID and Priority, as defined for that specific Access Port.
 * The extra tag is inserted in front of any other tags already in the frame.
 * Management traffic to device accepted from any Trunk port.
 * Management accepted from Access ports if Port VID matches Mgmt. domain.

--------------------------------------------------------------------------------

Press Space Bar To Browse Mode Setting, Press RETURN To SET New Mode.
Dn-Arrow to change settings for current mode
Save Changes and Exit: F3 or S. Exit without Saving: F4 or Q.
```

Press the down arrow on the computer keyboard to access the additional configuration commands.

3.5.3.5 Bandwidth (bw)

Displays settings for Bandwidth configuration.



SFP A/B Ports

Ingress Bandwidth Limit (CIR)	Monitors the traffic entering the unit (ingress), discarding traffic that exceeds a fixed Committed Information Rate (CIR) plus Burst Allocation (BA). Frames are not held in queue, they either meet the bandwidth limits and are accepted into the unit or they are dropped.
Max Burst Allocation size (BA)	The BA size is specified in bits; the # of bits above the bandwidth limit before packets are thrown away.
Ingress Burst Allocation	Bandwidth Limiting can be set at Ingress of each port individually by setting the MAX Bandwidth Limit in bits/Sec. and the BA in bits. Traffic in excess of the Bandwidth limit plus BA for any time interval will be dropped. This function utilizes an advanced “Leaky Token-Bucket” algorithm to provide typical resolution under 5% of the set values at all data rate and frames sizes.
Egress Traffic Shaping	Egress Traffic shaping actively controls the transmitter and *hard* limits the maximum frame rate that can be sent. Frames can be delayed in the internal buffers of the unit, waiting their turn to be sent. If the internal buffers are full, excess traffic will be dropped. The Unit Rate Control can be used to alleviate this.

TX1/2

<table>
<tr><td>Ingress Bandwidth Limit
(CIR)</td><td colspan="2">Monitors the traffic entering the unit (ingress), discarding traffic that exceeds a fixed Committed Information Rate (CIR) plus Burst Allocation (BA). Frames are not held in queue, they either meet the bandwidth limits and are accepted into the unit or they are dropped.</td></tr>
<tr><td>Max Burst Allocation size (BA)</td><td colspan="2">The BA size is specified in bits; the # of bits above the bandwidth limit before packets are thrown away.</td></tr>
<tr><td>Ingress Burst Allocation</td><td colspan="2">Bandwidth Limiting can be set at Ingress of each port individually by setting the MAX BW Limit in bits/Sec. and the BA in bits. Traffic in excess of the Bandwidth limit plus BA for any time interval will be dropped. This function utilizes an advanced “Leaky Token-Bucket” algorithm to provide typical resolution under 5% of the set values at all data rate and frames sizes.</td></tr>
<tr><td>Egress Traffic Shaping</td><td colspan="2">Actively controls the transmitter and hard limits the maximum frame rate that can be sent. Frames can be delayed in the internal buffers of the unit, waiting their turn to be sent. If the internal buffers are full, excess traffic will be dropped. The Unit Rate Control can be used to alleviate this.</td></tr>
<tr><td rowspan="3">OSI Level Used in Calculations

(Open Systems Interconnect, referring to the seven layers for TCP/IP)</td><td colspan="2">Choose Layer 1, 2 or 3 for the counter, this will determine how my bytes from the Ethernet frame are to be included in the calculations.</td></tr>
<tr><td>Layer 1:
Layer 2:
Layer 3:</td><td>Preamble + DA to CRC + IFG
Frames DA to CRC
Frames DA to CRC – 18
(- 4 if frame is tagged)</td></tr>
<tr><td>Explanations:

Preamble
DA
CRC
IFG</td><td>

= 8 bytes
= EtherNet Destination Address
= EtherNet Checksum
= 12 bytes</td></tr>
<tr><td>Unit Rate Control Enable/Disable</td><td colspan="2">Allows the end user to globally configure all Bandwidth settings when enabling Unit Rate Control (Flow Control). If the END device connected to the port also has Flow Control enabled, this will ensure packets will not be dropped.</td></tr>
</table>

OSI NOTES
The Bandwidth Limit functions can be adjusted to only count the Layer 1, 2, or 3 portions of the physical line rate. Layer 1 is used to relate Bandwidth to the physical line rate where a 100BaseT Ethernet line can carry a MAX bandwidth of 100Mbps. Layer 2 may be more useful when the Ethernet Frame may be carried over several different physical protocols such as SONET or SDH. Only the bandwidth required by the Ethernet frame is counted, making this a more consistent number over different protocols. Layer 3 counting could be used when a relationship to the actual customer data or line payload is required. If a 10 Mbps customer file needs to be sent in one second, then a minimum bandwidth limit of 10Mbps would need to use Layer 3 counting to allow this. *It must be noted that only Layer 1 counting is not affected by the size of the Ethernet frame. At 64 byte Ethernet frames, the MAX bandwidth the line can support at Layer 2 is only 76.2% of the line rate. This maximum falls to 54.8% of the line rate when counting is further limited by only counting Layer 3 payload data.*

3.5.4 Version

Entering **version** will display the version of the firmware operating the IE GIGA MC TX/SFP. Settings should be saved prior to reboot.

3.5.5 Viewing Port Statistics (ifstats)

To view port statistics on the IE GIGA MC TX/SFP, enter ifstats. This will open a screen displaying information on packets received and transmitted as defined by MIB-II standard RFC 1213.

Pressing the **Space Bar** will refresh the data on the screen.

```
->ifstats
MIB-II Var            SFP A        SFP B         TX 1         TX 2

-------------------------------------------------------------------------
PhysAddress    0000290262E2 0000290262E2 0000290262E2 0000290262E2
AdminStatus               1            1            1            1
OperStatus                1            1            2            1
LastChange          5894956      5665750          142      5663442
InOctets            5382096      7556480            0      7174046
InUcastPkts               0        10828            0        16405
InNUcastPkts          57872        68001            0        58095
InErrors                  0            0            0            0
InUnknownProt             0            0            0            0
OutOctets          12468585     11953238            0     13565810
OutUcastPkts            677         9373            0        20039
OutNUcastPkts        125398       115581            0       124763
OutDiscards               0            0            0            0
OutErrors                 0            0            0            0

Press SpaceBar to refresh, Any other key to exit_
```

3.5.6 Viewing Port RMON Statistics (rmstats)

To view port RMON (Remote MONitoring) statistics on IE GIGA MC TX/SFP, enter rmstats. This will display RMON information on packets received as defined in RFC 2819 for RMON.

Pressing the **Space Bar** will refresh the data on the screen.

```
->rmstats
RMON Counter          SFP A        SFP B         TX 1         TX 2

DropEvents                0            0            0            0
Octets              5385537      7570978            0      7183822
Pkts                  57909        78978            0        74599
BroadcastPkts             0          124            0        19034
MulticastPkts         57909        68021            0        39132
CRCAlignErrors            0            0            0            0
UndersizePkts             0            0            0            0
OversizePkts              0            0            0            0
Fragments                 0            0            0            0
Jabbers                   0            0            0            0
Collisions                0            0            0            0
Pkts64Octets          12644        12888            0        13404
Pkts65to127          162559       182051            0       196999
Pkts128to255           4662         4687            0         4730
Pkts256to511           4333         4402            0         4456
Pkts512to1023             0           14            0           34
Pkts1024toMAX             0            0            0            0

Press SpaceBar to refresh, Any other key to exit
```

3.5.7 System Description (sysDescr)

The sysDescr allows the end user to enter a description for the Black Box device. Within the iView² GUI, a name or some kind of identifier can be entered into the text box labeled **Description**. Once that description is saved, the identifier will be maintained, even if power is interrupted to the unit.

3.5.8 Reboot

Entering reboot will save settings and reboot the IE GIGA MC TX/SFP.

3.5.9 (Operation and Administration Management) OAM

```
------------------------------  OAM Settings  --------------------------------
                        SFP A                       SFP B
LB Ignore RX            Process Loopback            Process Loopback
LB Status               NoLoopback                  NoLoopback
OAM Enable              Enabled                     Enabled
Oper Status             Passive Wait                Passive Wait
OAM Mode                Passive                     Passive
Sym Per Events          Enabled                     Enabled
Frame Events            Enabled                     Enabled
Frm Secs Evnts          Enabled                     Enabled
Frm Peri Evnts          Enabled                     Enabled

                        TX 1                        TX 2
LB Ignore RX            Process Loopback            Process Loopback
LB Status               NoLoopback                  NoLoopback
OAM Enable              Disabled                    Disabled
Oper Status             Disabled                    Disabled
OAM Mode                Passive                     Passive
Sym Per Events          Enabled                     Enabled
Frame Events            Enabled                     Enabled
Frm Secs Evnts          Enabled                     Enabled
Frm Peri Evnts          Enabled                     Enabled
Use Arrow Keys To Move Cursor. Press Space Bar To Change Value.
Press RETURN To Set New Value. Press Q Or F4 To Exit.
```

Two modes of operations control the OAM function, Passive and Active. Passive mode is the default mode.

OAM AH passive/active is available on the fiber SFP ports and TX ports

- Supports Discovery functions on the SFP ports.

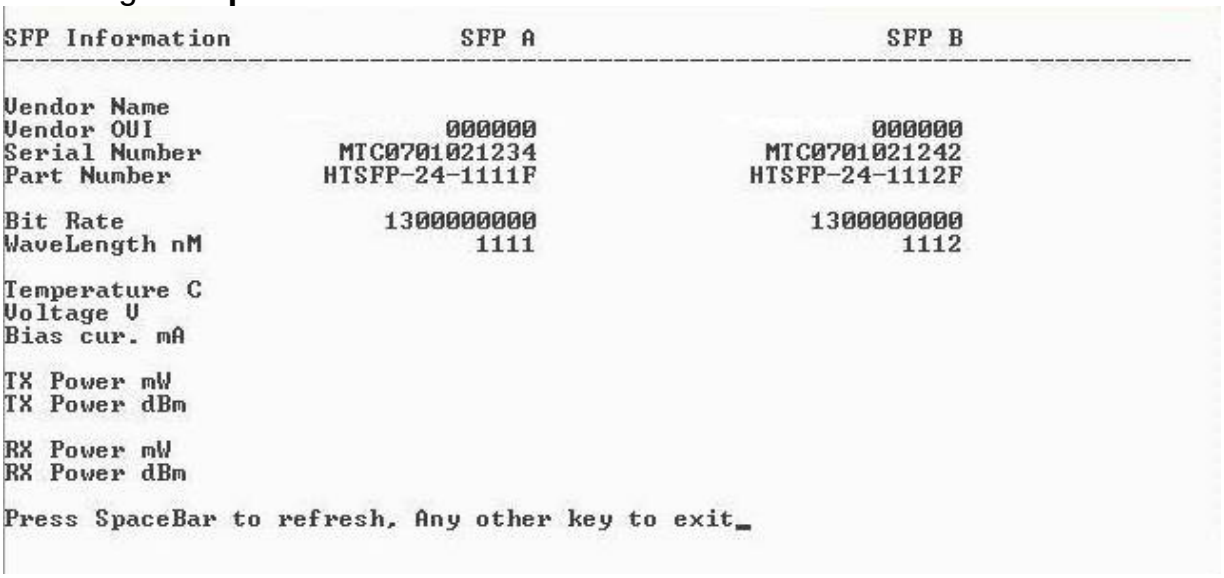
- Supports reporting OAM Flag Events (Link Fault, Critical Event, and Dying Gasp)

- Supports Loopback

3.5.10 Viewing SFP Statistics (sfpstats)

To view SFP statistics on the IE GIGA MC TX/SFP, enter sfpstats. This will open a screen displaying SFP information, including vendor, serial number, bit rate and other options.

Pressing the **Space Bar** will refresh the data on the screen.



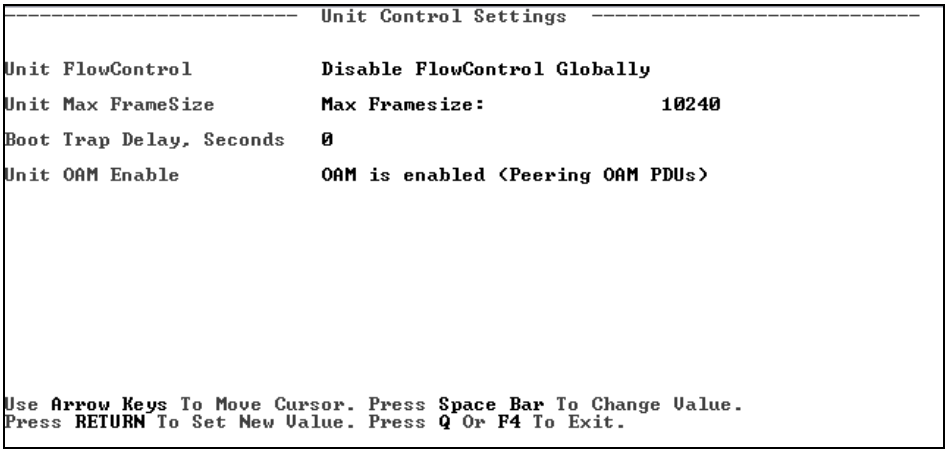
3.5.11 Unit

Advertise FlowC and **Force FlowCtrl** - This is the FlowControl feature.

- When using FlowControl functionality on any port, enable Global FlowControl. Then, configure each port individually.
- When using Auto Negotiation and FlowControl, set Advertise FlowC to Advertise Flow and set Force FlowCtrl to Flow Auto.
- Set Advertise FlowC to No Flow to disable FlowControl on a given port.
- When using FlowControl and Force Mode on a given port, set Advertise FlowC to Advertise Flow and set Force FlowCtrl to Frc FlowCt.

Unit FlowControl	This enables/disables FlowControl functionality on the unit and must be enabled for FlowControl to function on any port.

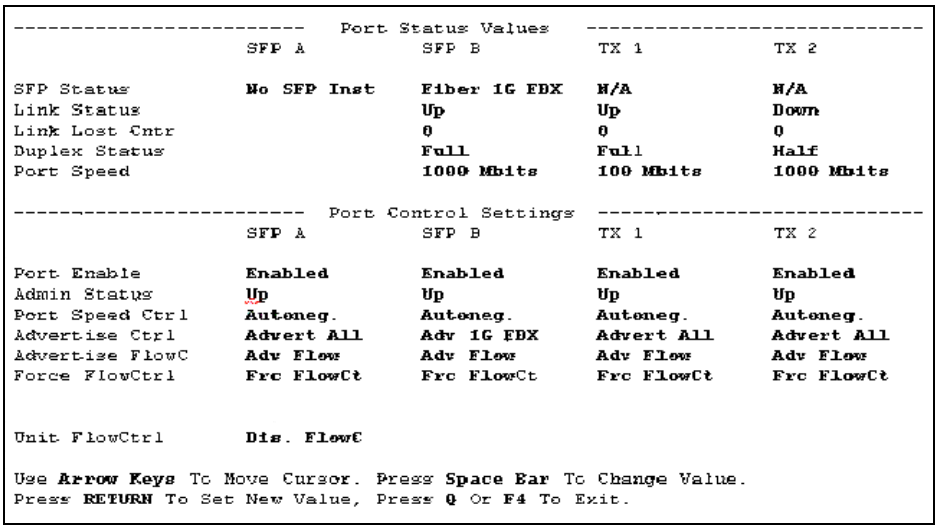
Unit FlowControl displays the following screen:



Unit FlowControl globally enables “Pause” frames to be sent.

3.5.12 Port Configuration (port)

Serial/Telnet sessions display port status as well as allowing configuration of some port features. Type **port** and press **Enter** to be taken to the Port screen. From this screen, view the port speed, duplex and link status.



The Port screen contains the following commands:

Port Enable	Enable/Disable the port. (Select Enable to enable the port.)
Admin Status	Set Administration level. (Select UP to enable management through the port.) Both settings must be enabled to enable the port.
Port Speed Ctrl	Set the port manually or for Auto Negotiation.
Advertise Ctrl	This is the Selective Advertising feature. Selective Advertising, when used in combination with Auto Negotiation, advertises the configured speed and duplex mode for the twisted pair ports. Auto Negotiation must be enabled for Selective Advertising.

NOTE
Selective Advertising must be used when connecting to a device that auto negotiates and a specific speed and duplex mode is desired.

3.6 Configuration File Save/Restore Function

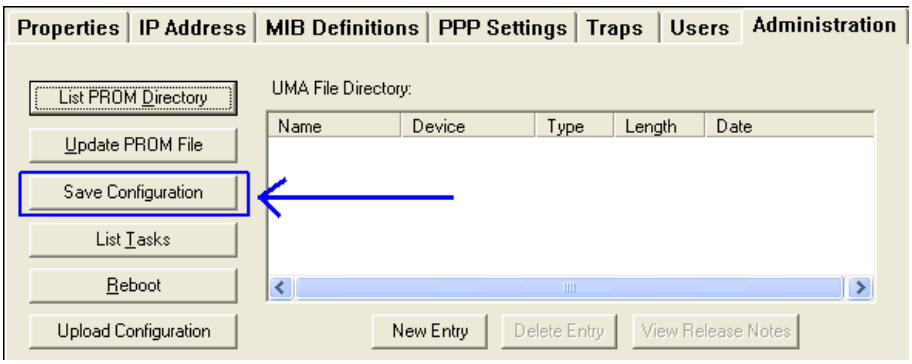
The Configuration File Save/Restore Function allows a user the ability to backup all the configuration settings of a unit. With this backup, a user can restore settings to a unit if necessary or use this backup to apply the same settings to a different unit.

All configurable managed objects are saved in a configuration file that is stored in the unit's Large File Area. This includes all configurable settings such as VLAN configurations, IP Address configuration and SNMP agent settings. The configuration file can be transferred from the unit to a PC and saved to disk through the iView^2 (iConfig view) protocol. The configuration file can be transferred from a PC to a unit of the same type through iView^2 (iConfig view) or TFTP into the unit's Large File Area. After the transfer is complete, the unit copies the configuration to flash and reboots.

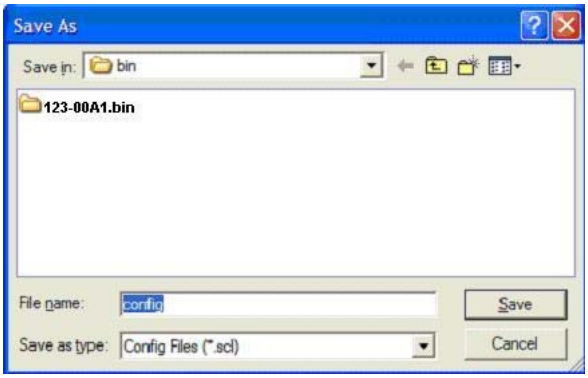
The configuration file's contents is device-type specific and can be identified by iView^2 (iConfig view) as a configuration file as well as to what type of device it is applicable to.

3.6.1 Saving a Configuration File to Disk:

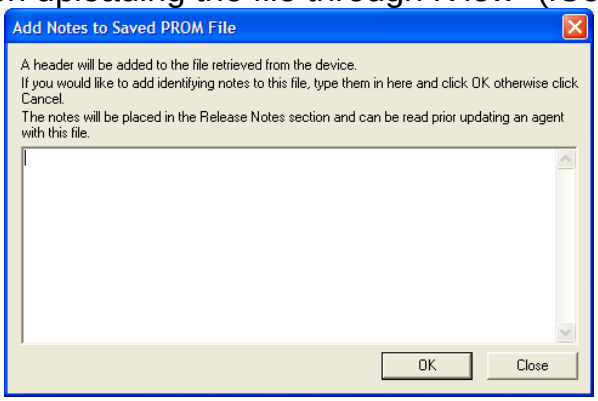
From the Administration Tab in iView^2 (iConfig view) click the **Save Configuration** button:



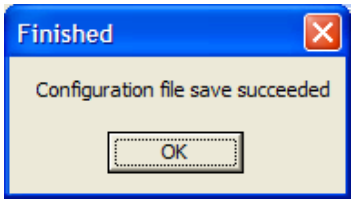
The user is prompted for a filename:



The user is prompted to enter any notes to the header of the saved file for future reference when uploading the file through iView^2 (iConfig view):

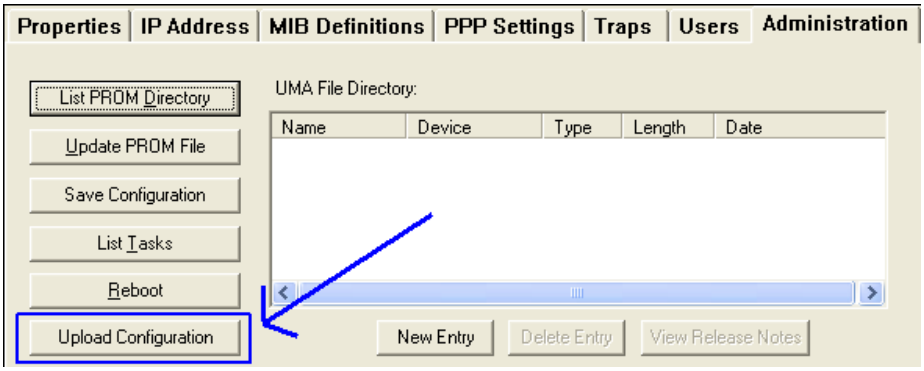


After the file transfer from the device to disk, the user is notified of the status:

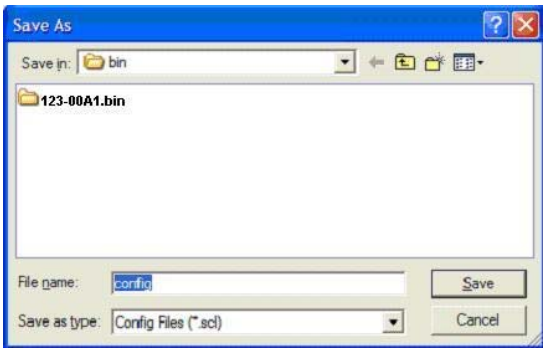


3.6.2 Uploading a Saved Configuration File through iView^2

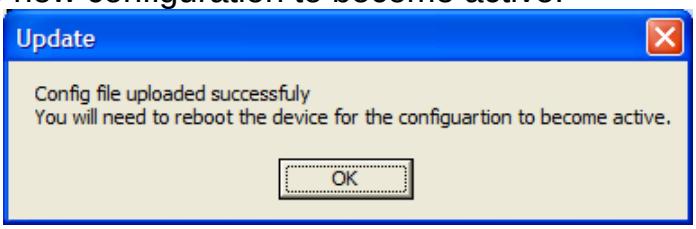
From the Administration Tab in iView^2 (iConfig view) click the **Upload Configuration** button:



The user will be prompted to select a configuration file. Once selected, the user can also view any notes that were added when the file was saved:



After selecting the configuration file, the file upload process begins; when completed, the user is notified of the status and also notified that a reboot is necessary for the new configuration to become active:

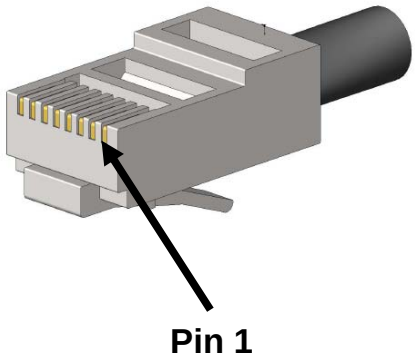


By design, the IP Address configuration currently on the device is kept intact and not overwritten by the new configuration file.

3.7 RJ-45 Data Port Pinout

The following table lists the pin configuration for the RJ-45 Data connector.

Pin	Signal Name 1000M	Signal Direction 10/100M
1	TXD1+	Out*
2	TXD1-	Out*
3	RXD2+	In*
4	D3+	
5	D3-	
6	RXD2-	In*
7	D4+	
8	D4-	



NOTE
The MDI/MDIX function will automatically adjust the direction of these signals to match the connected unit when running 10/100Base-T. 1000Base-T will use all 4 pairs in full duplex mode.

3.8 RS-232 Serial Console Port

The IE GIGA MC TX/SFP includes an RS-232 Mini Jack for the Console port to allow the end user to launch a serial session and access a list of commands. The serial port on the computer/terminal should be set for: 38.4K baud, 8 data bits, 1 stop bit, no parity, no flow control. The **F2** key functions as a Delete key on VT-100 emulators.

The following table lists the pin configuration for the RS-232 3-pin Mini Jack mating connector for the console serial port.

Pin	DB9-F Pin#	Signal Name	Direction
Tip	2	Transmit	Out of Unit
Ring	3	Receive	In to Unit
Sleeve	5	Return	Return

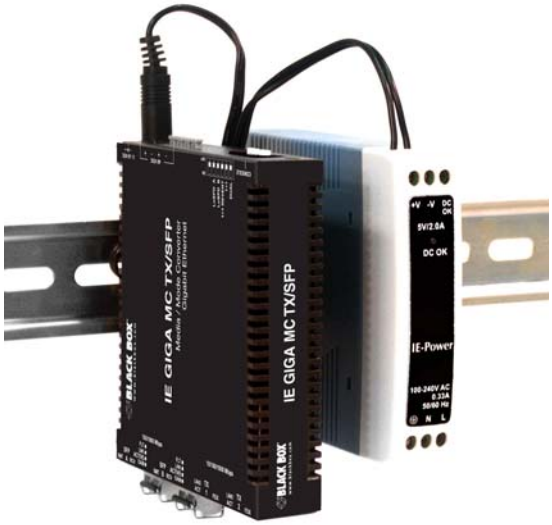
4. Install the IE GIGA MC TX/SFP

The IE GIGA MC TX/SFP has a small form factor making it ideal for installation in locations with limited space.

4.1 Powering the IE GIGA MC TX/SFP

The IE GIGA MC TX/SFP includes multiple powering options:

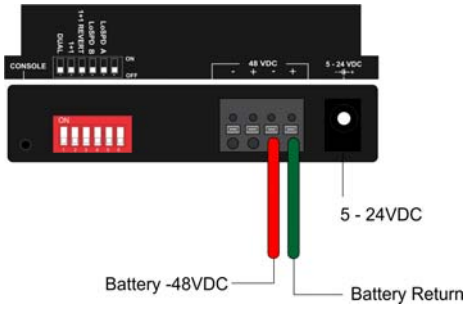
- AC adapter
- The 4-terminal DC power block
- An optional IE-Power/5V DIN railmount power supply, extended temperature
- An optional Double-USB Power Cable (available from Black Box)



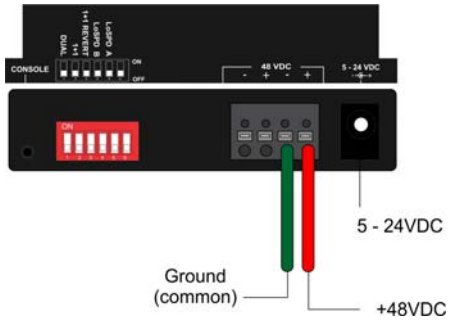
IE GIGA MC TX/SFP with optional DIN railmount power supply

4.1.1 DC Terminal Block Wiring Instructions

The IE GIGA MC TX/SFP can also be powered with the DC terminal block. From a power source, connect to any one positive and any one negative terminal on the IE GIGA MC TX/SFP.



TELCO (-48)



NOTE
When using stranded wire, the leads should be tinned. The DC terminal block is protected against polarity mis-wiring. AWG24 is recommended.

4.2 Mini-Serial Port

A console port, located next to the DIP Switch bay, allows the customer to use a local RS-232 serial interface for management. A special mini-jack to DB9-F cable is provided with the product for direct connection to a PC serial port.

NOTE
To log on through the serial port, set the computer/terminal for VT-100 emulation, with: 38.4K baud, 8 data bits, 1 stop bit, no parity, no FlowControl.

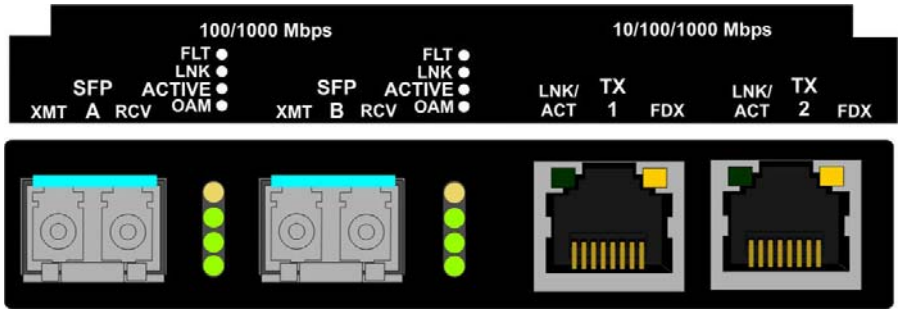
4.3 SFP Ports

The IE GIGA MC TX/SFP SFP ports support gigabit fiber SFPs and 100Mbps fiber SFPs, with or without Digital Diagnostics Monitoring Information (DDMI) as well as copper SFPs available in 10/100/1000Mbps and 1000Mbps. DDMI statistics provide real-time access to transceiver operating parameters such as voltage, temperature, laser bias current, and both transmitter and receive optical power. This information can be accessed through the management system. The SFPs must be MSA-compliant, and can be purchased from Black Box or other suppliers.

5. Operation

5.1 LED Operation

Each IE GIGA MC TX/SFP includes SFP and RJ-45 LEDs.



SFP LED functions are as follows:

LED	Function
FLT	Glows amber when a fault is detected.
LNK	Glows green with a valid optical link.
ACTIVE	Glows green when the port is active. OFF when SFP is in standby (does not indicate activity).
OAM	Glows green when an active OAM channel is established.

RJ-45 LED functions are as follows:

LED	Function
LNK/ACT	Glows green when a link is established on the TX port. Blinks green when activity is detected on the TX port.
FDX	Glows amber when an FDX link is established on the TX port. Not lit for HDX.

5.2 Autocross Feature for Twisted Pair Connections

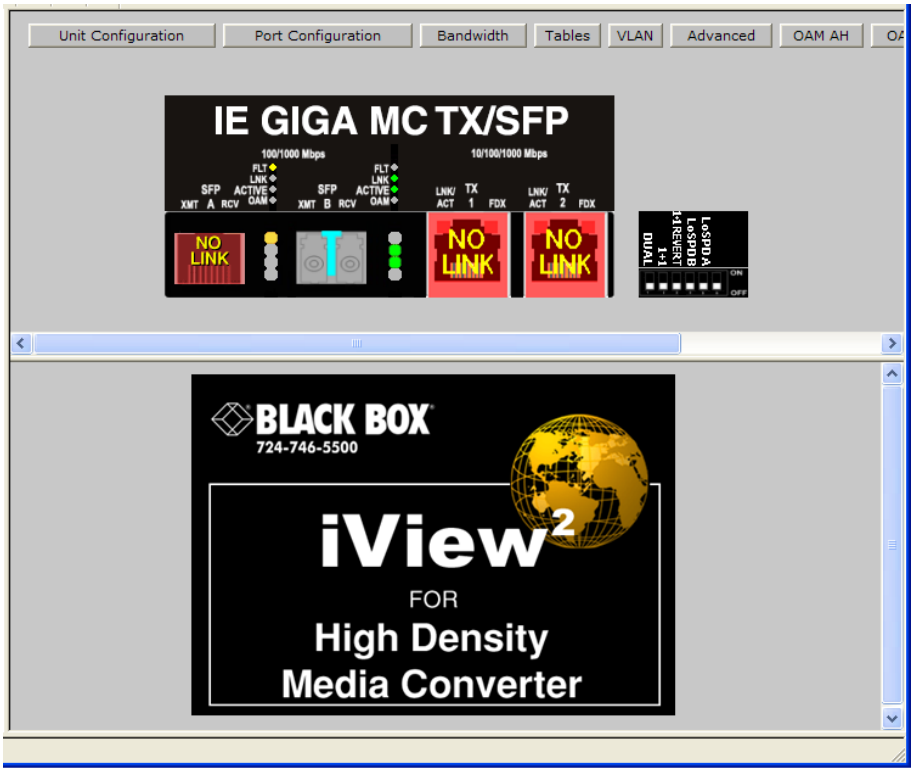
All fixed twisted pair ports on the IE GIGA MC TX/SFP include AutoCross, a feature that automatically selects between a crossover workstation and a straight-through connection depending on the connected device.

5.3 Using iView²

iView² is Black Box's management software, providing network management in an easy to use GUI. Once iView² is installed on a network management PC using a Windows operating system, use the Start menu to access iView².

NOTE
Windows SNMP services must be installed to receive traps.

The autoscan feature of iView² will detect Black Box devices on an active subnet and list them in the network outline. Click the connection for the IE GIGA MC TX/SFP to open its iView² screen. To perform additional configuration, select the iView² iConfig view icon on the toolbar in iView². This allows a session to be launched, and the default password/username is admin/admin. Additional private usernames and passwords can be entered in the USERS tab. If the list of passwords is not maintained, the usernames and passwords can be reset by opening a CLI session and typing in the cleandb command. This will reset all but the IP address of the device.



The following functions can be performed via iView²:

Function	Description
Unit Configuration	Display/modify unit information
Port Configuration	Display/modify port data
Bandwidth	Displays settings for Bandwidth configuration
Tables	Display statistics tables, including Unit and Port tables, RMON statistics, MIB-II ifTable and SFP Info.
VLAN	Provides configuration for VLAN IDs per port
Advanced	Reboot the module; also allows boot trap delay
OAM AH	Configure passive and active 802.3ah
OAM CFM	Perform administrative configuration functions
Agent Info	Displays SNMP agent data

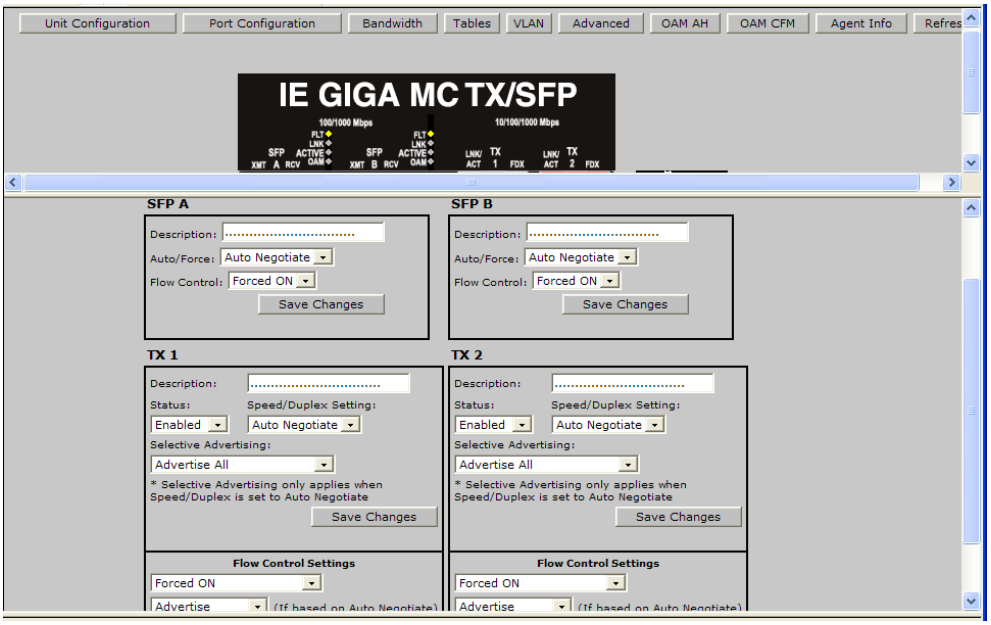
5.3.1 Unit Configuration

Select Unit Configuration to display/modify unit information including IP address (display only, modification not allowed), global flow control, maximum frame size and OAMPDU:

NOTE
Entering a descriptor in the Description field can make it easier to track down the source of a Trap.

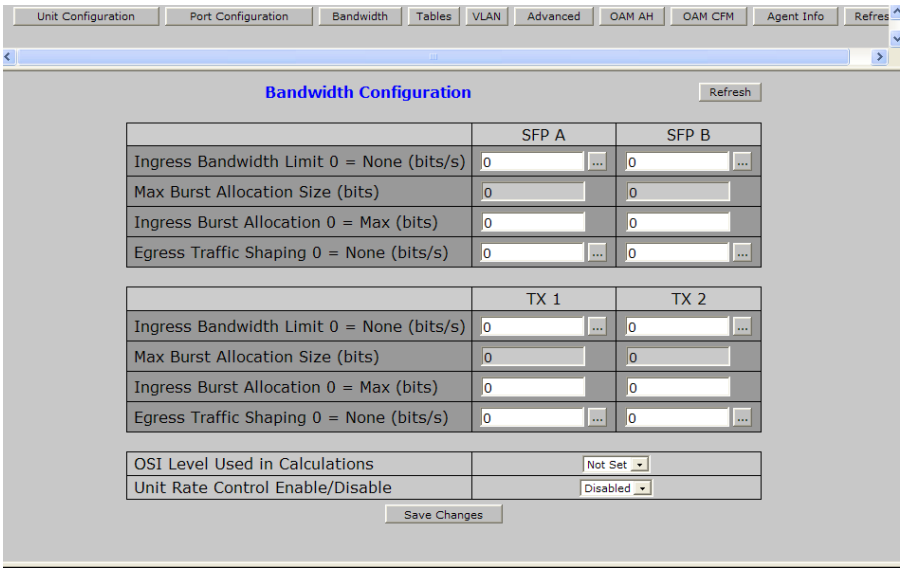
5.3.2 Port Configuration

Select Port Configuration to display/modify port information including description and flow control:



5.3.3 Bandwidth

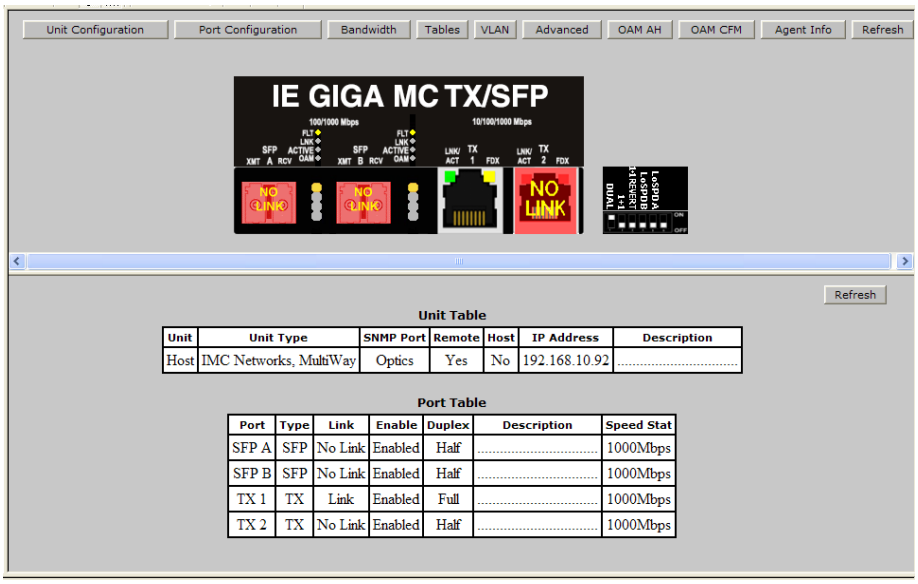
Select Bandwidth to display configure bandwidth settings for each port.



5.3.4 Tables

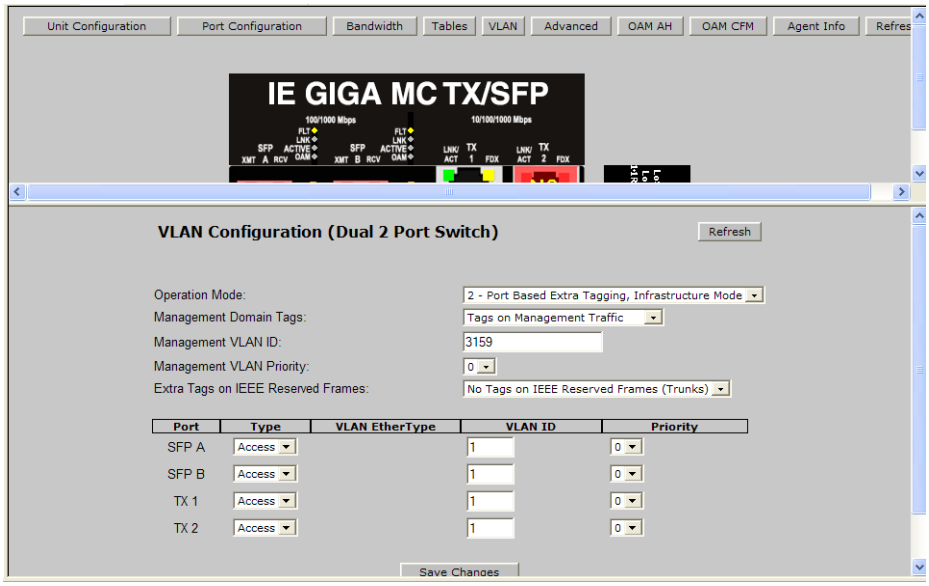
Select tables to display a screen from which to select the specific statistics to be viewed:

Select Unit and Port Tables to display the following information:



5.3.5 VLAN

Enter a VLAN ID between 1 and 4,094; possible priority settings are 0 (lowest priority) through 7 (highest priority).



WARNING
If a VLAN # is added to a port and is the same VLAN # assigned for a tag on management traffic, saving these changes will disrupt management indefinitely.

5.3.6 Advanced

Select Advanced to reboot the module:

5.3.7 OAM AH

Select OAM AH to display the following screen and monitor the status, configuration, loopback, event log and statistics:

From the above screen, select Configuration to display state and event configuration information as well as OAM supported functions:

5.3.8 Loopback Testing

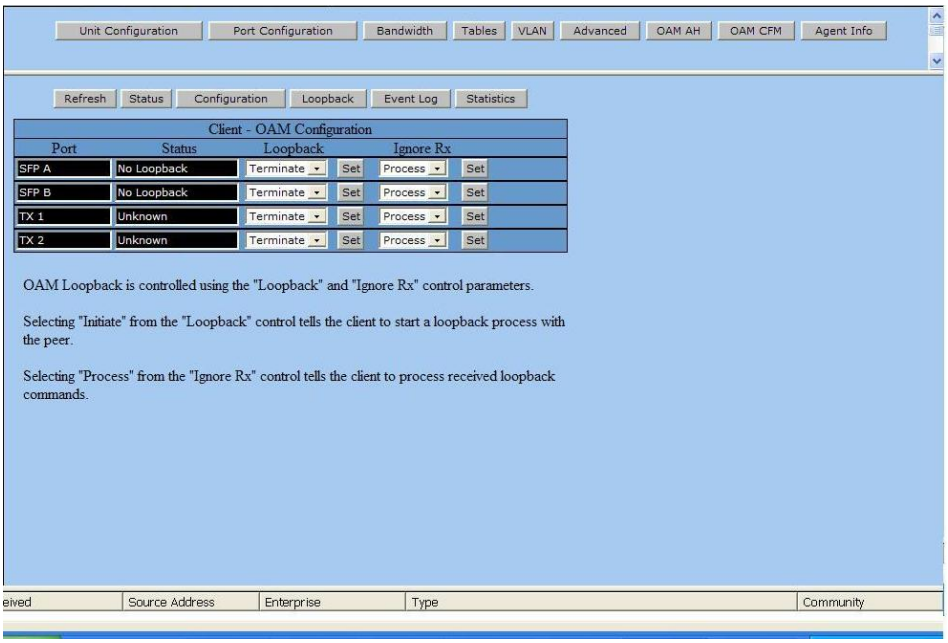
The IE GIGA MC TX/SFP includes Loopback testing functionality. This feature is selectable via iView2 within the OAM AH configuration. The menu of choices for all ports includes:

- Terminate/initiate
- Process/ignore

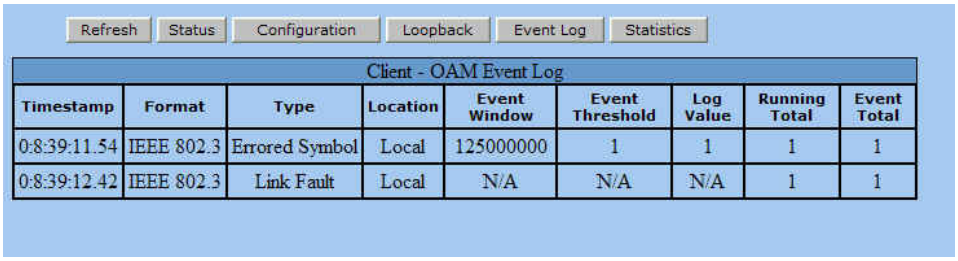
OAM Loopback is controlled by using the “Loopback” and “Ignore Rx” control parameters. Selecting “Initiate” from the “Loopback” control tells the client to start a loopback process with the peer. Selecting “Process” from the “Ignore Rx” control tells the client to process received loopback commands.

Only AH “Active” units can send a Loopback command to a remote unit. Either Active or Passive AH units can respond to a Loopback command, but must be configured to process these commands or they will be ignored.

Select Loopback to display loopback data and define how loopback is configured:

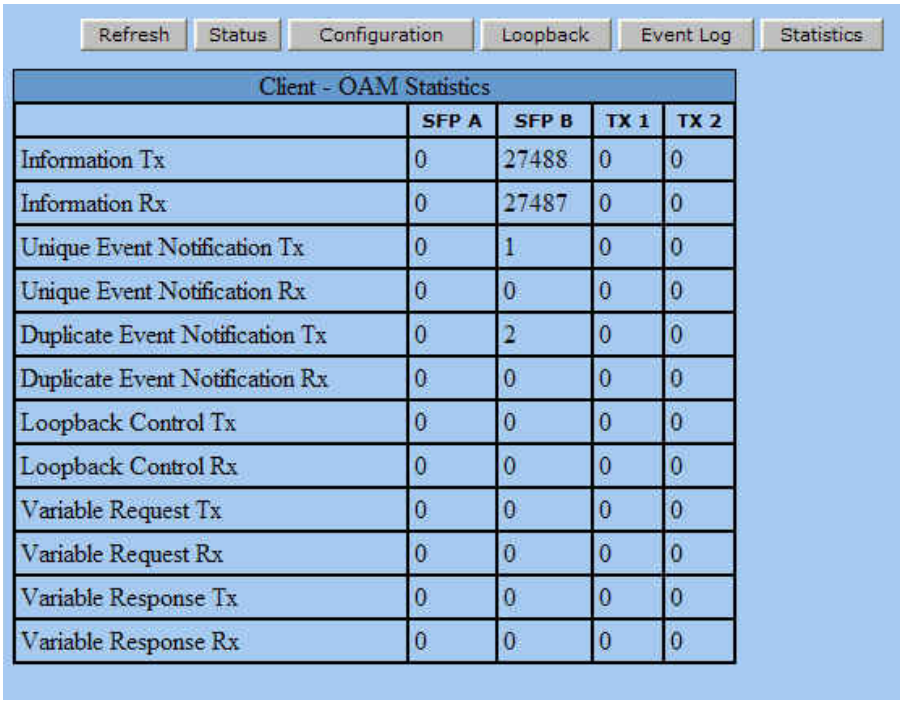


Select Event Log to display the OAM event log showing fault changes that have occurred via OAM configuration:



The OAM Event Log table displays a history of the threshold crossing events and non-threshold crossing events that have occurred at the Ethernet OAM AH Level. There is a maximum of 8 events that can be displayed. When the maximum number of events is reached older entries are deleted to make room for newer entries.

Select Statistics to display OAM statistics:

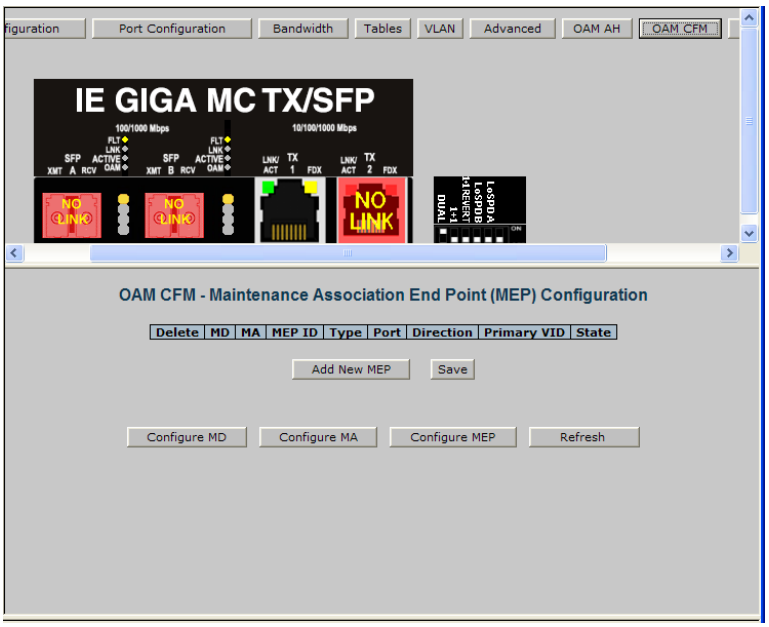


Client - OAM Statistics

	SFP A	SFP B	TX 1	TX 2
Information Tx	0	27488	0	0
Information Rx	0	27487	0	0
Unique Event Notification Tx	0	1	0	0
Unique Event Notification Rx	0	0	0	0
Duplicate Event Notification Tx	0	2	0	0
Duplicate Event Notification Rx	0	0	0	0
Loopback Control Tx	0	0	0	0
Loopback Control Rx	0	0	0	0
Variable Request Tx	0	0	0	0
Variable Request Rx	0	0	0	0
Variable Response Tx	0	0	0	0
Variable Response Rx	0	0	0	0

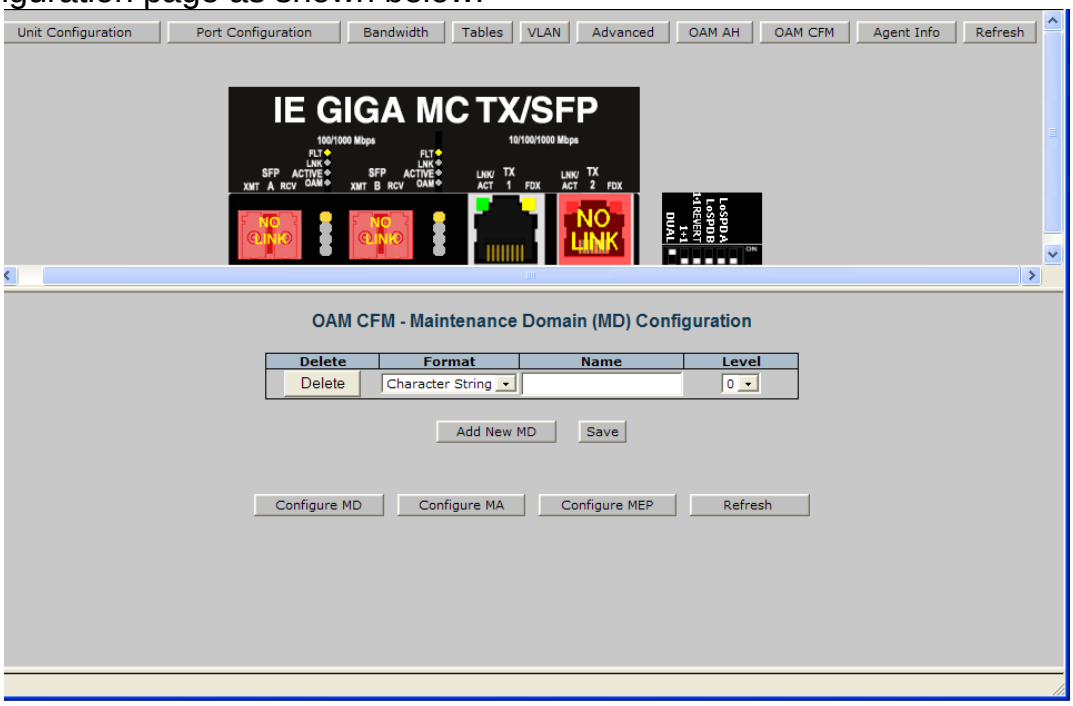
5.3.9 OAM CFM

Select OAM CFM to display the following screen and perform administrative control for Maintenance Domains (MDs), Maintenance Assocations (MAs) and Maintenance Association End Points (MEPs). The page contains a list of the local MEPs and provides menu controls to access the administrative functions associated with Create, Delete, and List MD, MA, and MEP information. An example of a default OAM CFM Configuration page is shown below:



The OAM CFM Configuration page defaults to the “Configure MEP” selections.

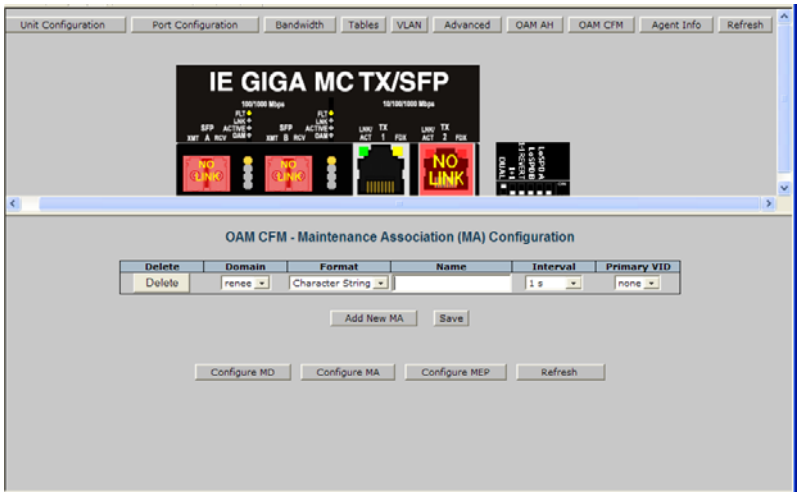
For the first-time configuration, the user must first create an MD, then an MA, then local and peer MEPs can be added. To create an MD, select the "Configure MD" button to display the OAM CFM Maintenance Domain Configuration page as shown below:



NOTE
iView2 will automatically display this page if there is no MD yet defined when the user attempts to access any other menu control.

Enter the MD name and select the level for the domain. To cancel the MD, select **Delete**. To store the MD, press **Save** and the screen is refreshed.

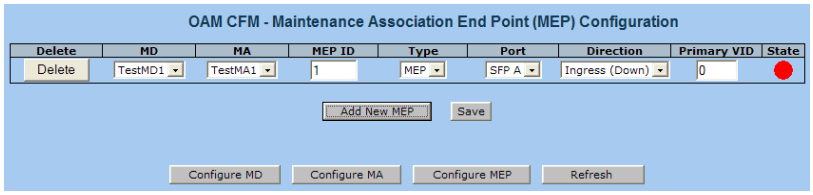
For the first configuration, create an MA after the MD. Select "Configure MA" to display the OAM CFM Maintenance Association Configuration screen as shown below:



NOTE
iView2 will automatically display this page if there is no MD yet defined when the user attempts to access any other menu control.

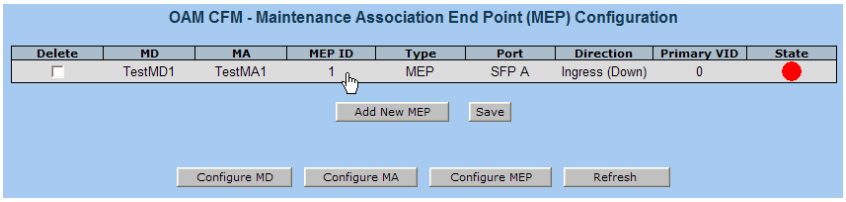
Select the **Domain** and **Format**, and enter the MA name in the **Name** field. Use **Interval** to select the interval for continuity check messaging, and choose **Primary VID**, if applicable. To cancel the MA without saving, select **Delete**. To store the MA, select **Save** and the screen is refreshed.

For a first time configuration, the next step is to create a MEP. Select **Add New MEP** to display the OAM CFM MEP configuration page as shown below:



Select the MD, MA, enter the MEP ID, select the appropriate type, port and direction, and select the **Primary VID**, if applicable. To cancel the MEP without saving, select **Delete**. To store the MEP, select **Save** and the screen is refreshed.

Once the user has configured the MD, MA and at least one MEP, a particular instance of an MEP can be accessed for more detailed configuration. To access a particular instance of an MEP, click on the row containing the desired MEP as shown below:



The current state of the MEP is shown by the color in the "State" column.

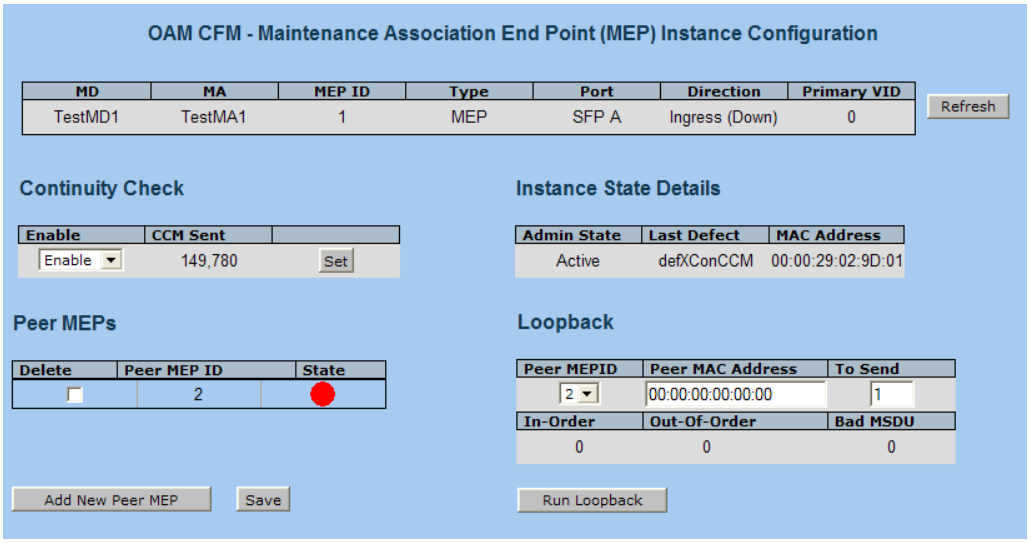
Color	Description
Green	Correctly functioning MEP—all MEP's are active and sending CCMs
Red	Idle state or problem associated with the MEP
Yellow	Not all peer MEP CCMs are being received.

Moving the mouse over the displayed color displays a comment giving additional information about the current state. Valid comments are:

- MEP is Idle
- MEP is Active

- Remote MEP Idle
- Remote MEP Failed

The MEP Instance Configuration page offers more details about an individual MEP as shown below:

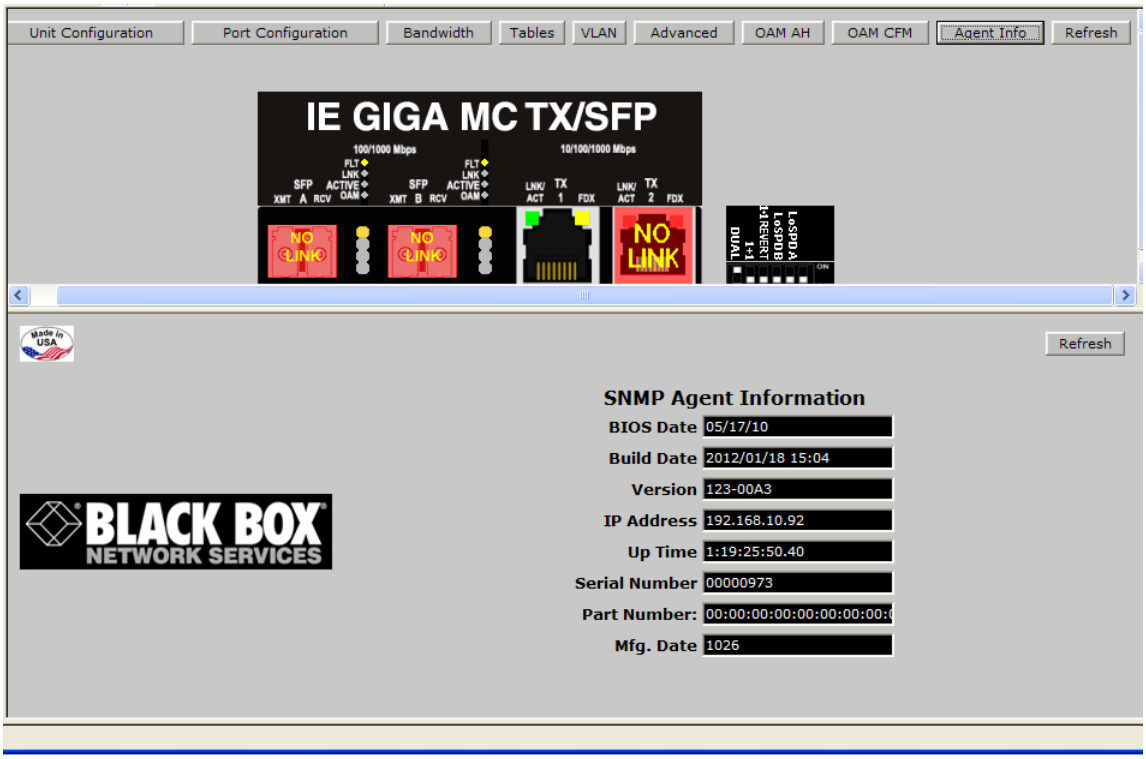


From this screen, the user can perform the following functions:

Function	Description
Continuity Check	Enable/disable CCMs and verify the number of CCMs that have been sent.
Instance State Details	Verify the current administrative state of the MEP, view the last defect identified by the MEP, and view the MAC address of the MEP.
Peer MEPs	Create/List/Delete Peer MEPS associated with the MEP
Loopback	Activate loopback and see the results of loopback operations.

5.3.10 Agent Info

Select Agent Info to display SNMP agent data:


Unit Configuration
Port Configuration
Bandwidth
Tables
VLAN
Advanced
OAM AH
OAM CFM
Agent Info
Refresh
IE GIGA MC TX/SFP
100/1000 Mbps
10/100/1000 Mbps
NO LINK
NO LINK
NO LINK
Refresh
SNMP Agent Information
BIOS Date 05/17/10
Build Date 2012/01/18 15:04
Version 123-00A3
IP Address 192.168.10.92
Up Time 1:19:25:50.40
Serial Number 00000973
Part Number: 00:00:00:00:00:00:00:00
Mfg. Date 1026
BLACK BOX
NETWORK SERVICES

6. Troubleshooting

If a fiber connection cannot be established, perform the following to make sure that the fiber transceivers on the IE GIGA MC TX/SFP are not over/under driving the fiber receivers:

1. Make sure the fiber wavelength on both connected devices match (i.e. both are 1310 nm single-mode fiber).

2. Make sure the twisted-pair port speed on the IE GIGA MC TX/SFP matches that of the end devices connected to the IE GIGA MC TX/SFP Configure the IE GIGA MC TX/SFP and its link partner to Auto Negotiation or, if using Force mode, be sure speed and duplex match.

3. IE GIGA MC TX/SFP allows the end user to assign a VLAN tag to all management traffic (SNMP and telnet). It is important to understand that IF using telnet or iView^2 to assign a VLAN tag to management traffic then as soon as this setting is saved the connectivity will be lost until the PC becomes a member of the VLAN which was assigned to management traffic.

   If a VLAN tag has been assigned to management traffic and the end user cannot re-establish a connection to the device via iView^2 or telnet, directly connect a PC to the device via the serial cable and review/modify the changes made (reference section on serial port config).

7. Contacting Black Box

Black Box Customer Service

Order toll-free in the U.S.: Call 877-877-BBOX
(outside U.S. call 724-746-5500)

Free technical support, 24 hours a day, 7 days a week.
Call: 724-746-5500 or Fax: 724-746-0746

Mail order: Black Box Corporation
1000 Park Drive, Lawrence, PA 15055-1018

Web site: www.blackbox.com

E-mail: info@blackbox.com

8. Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2. Dust caps are installed at Black Box to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. If you need to disconnect the fiber device, reinstall the protective dust caps.
3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4. If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

9. Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or stand alone units, containing electronic components. Always observe the following precautions when installing or handling these kinds of products.

1. Do not remove unit from its protective packaging until ready to install.
2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
3. Hold the units by the edges; do not touch the electronic components or gold connectors.
4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the modules or stand alone units over any surface.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

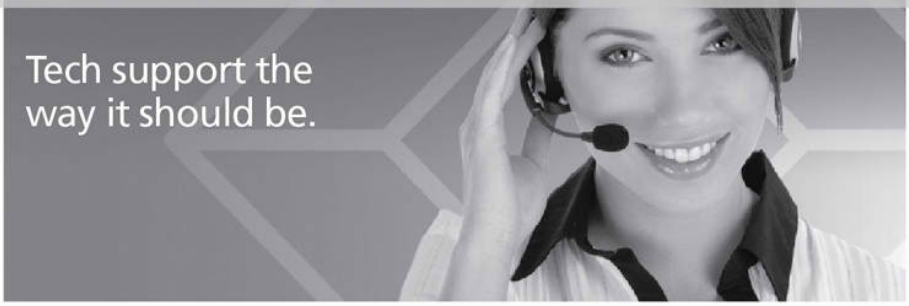
Glossary

The following are terms and phrases used within this manual, or which are found in documents associated with this equipment.

Term/Acronym	Definition
1+1	The Term “1+1” refers to line protection where identical information is transmitted on two redundant lines. The Receiver chooses the “best” line to use based on the BER of the line.
802.1ag	IEEE standard for end-to-end OAM
802.3ah	IEEE standard addressing Ethernet in the first mile and also OAM for point-to-point Ethernet links.
CFM	Connectivity Fault Management
CLI	Command Line Interface: An interface screen, often DOS-based, used for system management and diagnostics requiring the user to type commands rather than use a *GUI*.
CPE	Customer Premises Equipment; normally the end point of a leased fiber.
DC	Direct Current
DDMI	Digital Diagnostic Monitor Interface: A defined serial interface and data format typically used to access SFP internal information
DHCP	Dynamic Host Configuration Protocol: Used to automate configuration of computers that use TCP/IP
GUI	Graphical User Interface: Software that provides a visual interface to enable an end-user to manage and monitor network devices.
IEEE	Institute of Electrical and Electronics Engineers; IEEE develops industry-wide standards for use in a variety of electronic devices
IP	Internet Protocol
LED	Light Emitting Diode: A small stack of lights to indicate link, duplex or other options.
MA	Maintenance Association
MD	Maintenance Domain

Term/Acronym	Definition
MDI/MDIX	Media-Dependent Interface/ Media-Dependent Interface Crossover. The ability of an Ethernet port to automatically detect and configure its cabling connections to accommodate crossover or non-crossover wiring, depending on its link partner and cabling.
MEP	Maintenance Association End Points
MIB	Management Information Base: A database of objects that can be monitored by a network management system. Both SNMP and RMON use standardized MIB formats that allow any SNMP and RMON tools to monitor any device defined by a MIB.
MSA	Multi-Source Agreement (SFP): The standard an SFP must meet to be compatible in network devices.
NOC	Network Operations and Control Center
OAM	Operations, Administration and Maintenance
OAM CFM	IEEE 802.1ag Connectivity Fault Management
PROM	Programmable Read-Only Memory
SFP	Small Form-Factor Pluggable: An industry standard optical pluggable module.
SNMP	Simple Network Management Protocol: A set of protocols for managing complex networks over a standards-based IP network.
TFTP	Trivial File Transfer Protocol
VLAN	Virtual Local Area Network

Black Box Tech Support: FREE! Live. 24/7.



Great tech support is just 30 seconds away at
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